

## Claims

I claim:

1. A center beam rail road car comprising:
  - a deck structure supported on rail car trucks, said deck structure having first and second end portions and a medial portion lying between said first and second end portions, said medial portion being stepped downward relative to said end portions;
  - a central beam assembly running lengthwise along said rail road car between said bulkheads, said beam assembly standing upwardly of said deck structure; and
  - said medial portion being stepped downward relative to said end portions by a distance of at least 30 inches.
2. The center beam rail road car of claim 1, further comprising:
  - a center sill extending along said rail road car, said center sill having an upper flange, a lower flange, and at least one upright web connecting said upper and lower flanges;
  - at least a portion of said upper flange lying at a first height corresponding to said first end portion of said deck structure; and
  - at least a portion of said lower flange lying at a second height corresponding to said medial portion of said deck structure.
3. The center beam rail road car of claim 2 wherein:
  - said center sill has two, spaced apart upright webs;
  - said center sill has a height measured across said upper and lower flanges, and a width measured across said webs; and
  - along at least part of said center sill between said trucks, said center sill has an aspect ratio of said height to said width of at least 2.4 : 1.0.
4. The center beam rail road car of claim 1 wherein said central beam assembly includes an array of posts extending upwardly from said center sill, at least one of said posts having a roll-formed section, and at least part of said roll formed section being oriented to present a smooth, roll formed surface to lading placed outboard thereof.
5. The center beam rail road car of claim 4 wherein said at least one posts is a hollow four sided tube.
6. The center beam rail road car of claim 3 wherein, along said medial portion of said deck structure, said center sill has at least one web separator plate mounted between said

webs of said center sill.

7. The center beam rail road car of claim 1 wherein a transversely oriented step bulkhead extends upwardly between said medial portion of said deck structure and said first end portion of said deck structure, and a foothold is mounted to said step bulkhead to facilitate ascent from said medial portion of said deck structure to said end portion of said deck structure.
8. A center beam rail road car, comprising:
  - a deck structure mounted on a pair of first and second spaced apart rail car trucks;
  - a central vertical web assembly running along said car, said vertical web assembly extending upwardly of said deck structure, and
  - a top chord surmounting said vertical web assembly;
  - said deck structure including first and second end decking portions mounted over said respective first and second trucks, said first and second end decking portions having structural members presenting respective first and second end portion load bearing interfaces, and a medial decking portion lying between said trucks, said medial decking portion having at least one member presenting a medial load bearing interface;
  - said medial load bearing interface being stepped downward relative to said first portion load bearing interface through a step distance; and
  - said step distance being greater than 30 inches.
9. A center beam rail road car comprising:
  - a deck structure mounted on a pair of first and second spaced apart rail car trucks, and
  - a central vertical beam assembly running along said car, said vertical beam assembly extending upwardly of said deck structure;
  - said deck structure including first and second end decking portions mounted over said respective first and second trucks, and a medial decking portion lying between said trucks, said medial decking portion being stepped downward relative to said first and second end decking portions; and
  - said medial decking portion having a pair of first and second medial decking side sill portions mounted therealong, each of said medial decking side sill portions having a web, said web having an upper edge and a lower edge, said upper edge lying further transversely outboard than said lower edge.
10. The center beam rail road car of claim 9 wherein said medial decking side sill has a

load securing device mounted transversely outboard thereof.

11. The center beam rail road car of claim 9 wherein said medial deck side sill has a winch mounted to said first medial decking side sill portion, and a catch mounted to said second medial decking side sill portion whereby a strap held by said catch on one side of said center sill rail road car can be tightened over the car, and lading thereon, by said winch.
12. The center beam rail road car of claim 9 wherein said end decking portions each have first and second end decking side sill portions, and said end decking side sill portions have a greater depth of section than said medial decking side sill portions.
13. A center beam rail road car comprising:
  - a deck structure mounted on a pair of first and second spaced apart rail car trucks for rolling motion in a longitudinal direction;
  - a central beam assembly running along said car, said central beam assembly extending upwardly of said deck structure;
  - said deck structure including first and second end decking portions mounted over said respective first and second trucks, and a medial decking portion lying between said trucks, said medial decking portion being stepped downward relative to said first and second end decking portions;
  - said medial decking portion having a pair of medial decking side sills mounted therealong;
  - at least one of said end decking portions having a pair of end decking side sills mounted therealong; and
  - said end decking side sills having a greater depth of section than said medial decking side sills.
14. A center beam rail road car comprising:
  - a deck structure carried by rail car trucks, said deck structure having first and second end portions and a medial portion lying between said first and second end portions, said medial portion being stepped downward relative to said end portions;
  - first and second end bulkheads extending upwardly from opposite ends of said deck structure;
  - a central vertical beam assembly running lengthwise along said rail road car between said bulkheads, said beam assembly standing upwardly of said deck structure;
  - said medial portion of said deck structure being connected to said first end portion of

said deck structure at a first step; and  
said first step having a foothold mounted thereto to facilitate movement of personnel  
between said first end portion and said medial portion of said deck structure.

15. A center beam rail road car comprising:  
a deck structure supported on rail car trucks for rolling motion in a longitudinal direction;  
said deck structure including a pair of first and second end portions, and a medial  
portion carried between said end portions, said medial portion being stepped  
downwardly relative to said end portions;  
a center sill running along said deck structure;  
said center sill having a first center sill end portion, said center sill end portion having  
an upper flange and a pair of spaced apart webs extending downwardly from  
said upper flange;  
a draft pocket cap plate mounted within said first center sill end portion between said  
pair of spaced apart webs, said draft pocket cap plate lying at a lower level  
than said deck sheet, whereby a draft pocket is defined between said pair of  
webs and below said draft pocket cap plate.

16. The center beam rail road car of claim 15 wherein a first bolster extends laterally from  
said main sill to support said first end portion of said deck structure, said bolster having a  
upper flange extending in a plane lying at a greater height from top of rail than said draft  
pocket cap plate.

17. The center beam rail road car of claim 15 wherein:  
said center sill has a central portion adjacent to said medial portion of said deck  
structure and first and second end portions adjacent to said first and second  
end portions of said deck structure;  
said central portion of said center sill has an upper flange, a pair of spaced apart webs  
extending downwardly from said upper flange and a lower flange mounted to  
said webs, said upper flange, said lower flange and said webs of said center  
sill defining a hollow box beam;  
said medial portion of said deck structure has a deck sheet; and  
said lower flange of said central portion of said center sill is mounted at a level  
corresponding to said deck sheet of said medial portion of said decking  
structure.

18. The center beam car of claim 17 wherein said center sill has a depth of section

between said upper flange and said bottom flange of at least 30 inches.

19. The center beam car of claim 15 wherein:  
side sills extend along either side of said deck structure;  
said side sills each have a medial portion running along said medial portion of said deck structure, and first and second end portions running along said first and second end portions of said deck structure; and  
said end portions of said side sills have a greater depth of section than said medial portions of said side sills.
20. The center beam car of claim 15 wherein said upper flange of said first end portion of said center sill is mounted more than 42 inches above top of rail.
21. The center beam car of claim 15 wherein said first end portion of said deck structure includes a deck sheet mounted higher relative to top of rail than said draft pocket cap plate.
22. The center beam car of claim 15 wherein said first end portion of said deck structure includes deck sheeting mounted to said upper flange of said first end portion of said center sill, said sheeting extending laterally outboard from said center sill.
23. The center beam car of claim 15 wherein a bolster extends laterally from said center sill above one of said trucks, and said bolster has an upper flange mounted flush with said upper flange of said end portion of said center sill.
24. The center beam car of claim 23 wherein said medial portion of said deck has a lading interface upon which lading can be carried, and said upper flange of said bolster is mounted at least 30 inches higher than said lading interface of said medial portion of said deck structure.
25. The center beam rail road car of claim 15 wherein:  
said center sill has a central portion adjacent to said medial portion of said decking structure and first and second end portions adjacent to said first and second end portions of said decking structure;  
said central portion of said center sill has an upper flange, a pair of spaced apart webs extending downwardly from said upper flange and a lower flange mounted to said webs, said upper flange, said lower flange and said webs of said center

sill defining a hollow box beam;  
said medial portion of said deck structure has a deck sheet; and  
said lower flange of said central portion of said center sill is mounted at a level  
corresponding to said deck sheet of said medial portion of said decking  
structure.

26. The center beam car of claim 25 wherein said center sill has a depth of section  
between said upper flange and said bottom flange of at least 30 inches.

27. A center beam rail road car comprising:  
a deck structure having first and second end portions and a medial portion lying  
between said first and second end portions, said medial portion being stepped  
downward relative to said end portions;  
first and second end bulkheads extending upwardly from opposite ends of said deck  
structure;  
a central vertical beam assembly running lengthwise along said rail road car between  
said bulkheads, said beam assembly including a center sill, a top chord spaced  
upwardly from said center sill, and structural members extending upwardly of  
said deck structure, said structural members connecting said center sill and  
said top chord;  
said first end portion of said deck structure having a first end deck sheet;  
said center sill having a first center sill end portion, said center sill end portion having  
an upper flange and a pair of spaced apart webs extending downwardly from  
said upper flange;  
a draft pocket cap plate mounted within said first center sill end portion between said  
pair of spaced apart webs, said draft pocket cap plate lying at a lower level  
than said deck sheet; and  
a draft pocket defined between said pair of webs and below said draft pocket cap  
plate.

28. The center beam rail road car of claim 27 wherein a first bolster extends laterally from  
said main sill to support said first end portion of said deck structure, said bolster having a  
upper flange extending in a plane lying at a greater height from top of rail than said draft  
pocket cap plate.

29. The center beam car of claim 27 wherein:  
side sills extend along either side of said deck structure;

said side sills each have a medial portion running along said medial portion of said deck structure, and first and second end portions running along said first and second end portions of said deck structure; and  
said end portions of said side sills have a greater depth of section than said medial portions of said side sills.

30. A center beam rail road car comprising:  
a deck structure carried on railcar trucks for rolling motion in a longitudinal direction,  
a pair of first and second bulkheads extending upwardly of said deck structure at either end thereof, and a central beam assembly standing upwardly of said deck structure and running lengthwise along said deck structure between said bulkheads;  
said deck structure being supported by a center sill, said center sill having a first, longitudinally outboard portion and a second, portion between said rail car trucks; and  
said second portion being narrower than said first portion.

31. The center beam rail road car of claim 30 wherein:  
said first portion of said center sill includes a first pair of spaced apart webs;  
said second portion includes a second pair of spaced apart webs;  
said first portion has a first width measured across said first pair of webs;  
said second portion has a second width measured across said second pair of webs; and  
said second width is less than said first width.
32. The center beam rail road car of claim 30 wherein said center sill includes a third portion between said first and second portions, and said third portion tapers from said first portion to said second portion.
33. The center beam rail road car of claim 30 wherein said second portion of said center sill has a greater depth than said first portion of said center sill.
34. The center beam rail road car of claim 30 wherein said first portion of said center sill includes members defining a draft pocket therein, and said first portion of said center sill has an overall height greater than said draft pocket.
35. The center beam rail road car of claim 30 wherein said second portion has a height and a width, and the ratio of said height to said width is greater than 2 :

1.

36. The center beam rail road car of claim 35 wherein said ratio lies in the range of 3.0 : 1 to 5.0 : 1.

37. The center beam rail road car of claim 35 wherein said ratio is about 3.4 : 1.

38. The center beam car of claim 30 wherein said first portion has a height and a width, and the ratio of said height to said width is greater than 1 : 1.

39. The center beam rail road car of claim 38 wherein said ratio is in the range of 1.5 : 1 to 3.0 : 1.

40. The center beam rail road car of claim 38 wherein said ratio is about 2.0 : 1.

41. A center beam rail road car comprising:  
a deck structure carried on railcar trucks for rolling motion in a longitudinal direction,  
and a central beam assembly standing upwardly of said deck structure and  
running lengthwise along said deck;  
said deck structure being supported by a center sill,  
said center sill having a first portion mounted between said trucks, said first portion  
having a height and a width, said height being greater than said width;  
said center sill having at least one internal web member mounted therewithin; and  
said center sill having welding apertures formed therein, said welding apertures  
permitting at least a portion of said web member to be welded in place from  
outside said center sill.

42. The center beam rail road car of claim 41 wherein said web member has a flange mounted along an edge thereof, said apertures each have a periphery, said flange is mounted next to said welding apertures, and said flange is welded to said center sill at a weld formed along at least a portion of the periphery of at least one of said apertures.

43. The center beam rail road car of claim 41 wherein said web is a first web, said central beam assembly includes at least one post standing upwardly of said center sill, said post having a second web standing in a vertical plane perpendicular to the rolling direction of said rail road car, and said first web is positioned to provide web



continuity with said second web.

44. The center beam rail road car of claim 41 wherein said web is a first web, said central beam assembly includes at least one post standing upwardly of said center sill, said post having a second web standing in a vertical plane perpendicular to the rolling direction of said rail road car, and said first and second webs are co-planar.
45. The center beam rail road car of claim 41 wherein the ratio of said height to said width is greater than 2.0 : 1.
46. The center beam rail road car of claim 41 wherein the ratio of said height to said width is greater than 3.0 : 1.
47. The center beam rail road car of claim 41 wherein said web is a first web, said decking structure includes at least one cross bearer extending laterally to either side of said center sill, and said cross bearer has a second web, and said first and second webs are co-planar.
48. The center beam rail road car of claim 41 wherein said cross-bearer is underslung relative to said center sill.
49. The center beam rail road car of claim 41 wherein said decking structure includes a first portion mounted above one of said trucks, and a second portion mounted between said trucks, and said second portion of said decking structure is stepped downward relative to said first portion.
50. The center beam rail road car of claim 49 wherein said first portion of said center sill stands upwardly of said second portion of said decking structure.
51. The center beam rail road car of claim 50 wherein said second portion of said decking structure includes a lading supporting surface lying laterally outboard of said first portion of said center sill.
52. A center beam rail road car comprising:  
a deck structure carried on railcar trucks for rolling motion in a longitudinal direction,  
and a central beam assembly standing upwardly of said deck structure and  
running lengthwise along said deck;

said deck structure being supported by a center sill,  
 said deck structure including a first portion mounted above one of said trucks, and a  
     second portion mounted between said trucks, said second portion of said deck  
     structure being stepped downwardly relative to said first portion of said deck  
     structure;  
 said center sill having a first portion mounted between said trucks, said first portion  
     having a height and a width, said height being greater than said width in a ratio  
     of at least 2:0 : 1.0; and  
 said center sill having at least one internal web separator mounted therewithin.

53. The center beam rail road car of claim 52 wherein:  
 said central beam assembly includes at least one post standing upwardly from said  
     first portion of said center sill; and  
 said post has a web located above said internal web member of said center sill.
54. The center beam rail road car of claim 52 wherein said second portion of said decking  
 structure includes at least one cross-bearer extending laterally to either side of said  
 first portion of said center sill, said cross-bearer has a cross-bearer web, and said web  
 of said cross-bearer is co-planar with said internal web member of said center sill.
55. The center beam rail road car of claim 54 wherein said second portion of said center  
 sill is underslung by said cross-bearer and said web of said cross bearer passes below  
 said internal web member of said first portion of said center sill.
56. A center beam rail road car comprising:  
 a center sill supported by rail car trucks;  
 a deck structure mounted to said center sill and extending to either side thereof, said  
     deck structure having first and second end portions and a medial portion lying  
     between said first and second end portions, said medial portion being stepped  
     downward relative to said end portions;  
 a central beam assembly running lengthwise along said rail road car, said central  
     beam assembly standing upward of said deck structure;  
 said first end portion of said deck structure having a first end deck sheet;  
 said center sill having a first center sill end portion, said center sill end portion having  
     an upper flange and a pair of spaced apart webs extending downwardly from  
     said upper flange;  
 a draft pocket cap plate mounted within said first center sill end portion between said

pair of spaced apart webs, said draft pocket cap plate lying at a lower level than said deck sheet, a draft pocket being defined between said pair of webs and below said draft pocket cap plate.

57. A center beam rail road car comprising:

a deck structure having first and second end portions and a medial portion lying between said first and second end portions, said medial portion being stepped downward relative to said end portions;

first and second end bulkheads extending upwardly from opposite ends of said deck structure;

a central vertical beam assembly running lengthwise along said rail road car between said bulkheads, said beam assembly including a center sill, a top chord spaced upwardly from said center sill, and posts extending upwardly of said deck structure, said posts connecting said center sill and said top chord;

said first end portion of said deck structure having a first end deck sheet;

said center sill having a first center sill end portion, said center sill end portion having an upper flange and a pair of spaced apart webs extending downwardly from said upper flange;

a draft pocket cap plate mounted within said first center sill end portion between said pair of spaced apart webs, said draft pocket cap plate lying at a lower level than said deck sheet; and

a draft pocket defined between said pair of webs and below said draft pocket cap plate.

58. The center beam rail road car of claim 57 wherein a first bolster extends laterally from said main sill to support said first end portion of said deck structure, said bolster having an upper flange extending in a plane lying at a greater height from top of rail than said draft pocket cap plate.

59. The center beam rail road car of claim 57 wherein:

said center sill has a central portion adjacent to said medial portion of said decking structure and first and second end portions adjacent to said first and second end portions of said decking structure;

said central portion of said center sill has an upper flange, a pair of spaced apart webs extending downwardly from said upper flange and a lower flange mounted to said webs, said upper flange, said lower flange and said webs of said center sill defining a hollow box beam;

said medial portion of said deck structure has a deck sheet; and

said lower flange of said central portion of said center sill is mounted at a level corresponding to said deck sheet of said medial portion of said decking structure.

60. The center beam car of claim 59 wherein said center sill has a depth of section between said upper flange and said bottom flange of at least 30 inches.
61. The center beam car of claim 57 wherein:  
side sills extend along either side of said deck structure;  
said side sills each have a medial portion running along said medial portion of said deck structure, and first and second end portions running along said first and second end portions of said deck structure; and  
said end portions of said side sills have a greater depth of section than said medial portions of said side sills.